

From 10 GeV to 20 GeV electron beam at ePHENIX

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ePHENIX Lol considerations

10 GeV -> 20 GeV

Scattering electron kinematics: see below

Scattered electron ID: see below

Q2&x resolution: see below

SIDIS (hadron measurements):

barrel and h-going direction: mainly defined by hadron beam energy => all conclusions in ePHENIX Lol are valid for 20 GeV electron beam

e-going direction: not considered in Lol; may need a look

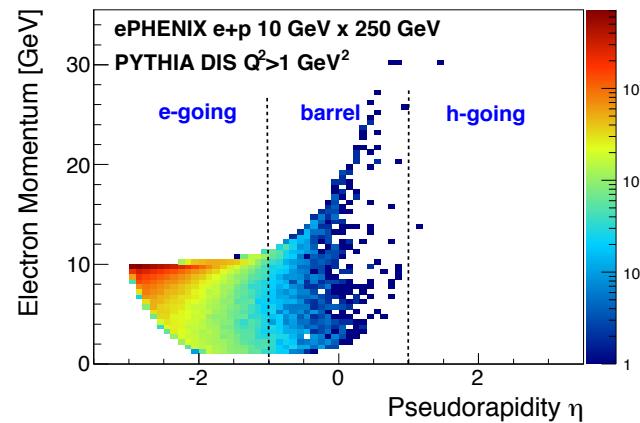
Exclusive DIS (e.g. DVCS): see below

Diffractive (rapidity gap):

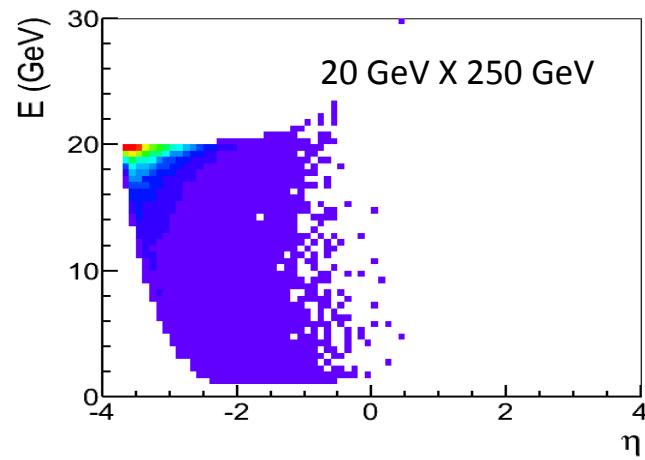
Don't expect any change – depends mainly on hadron beam

Scattering electron kinematics

10 GeV



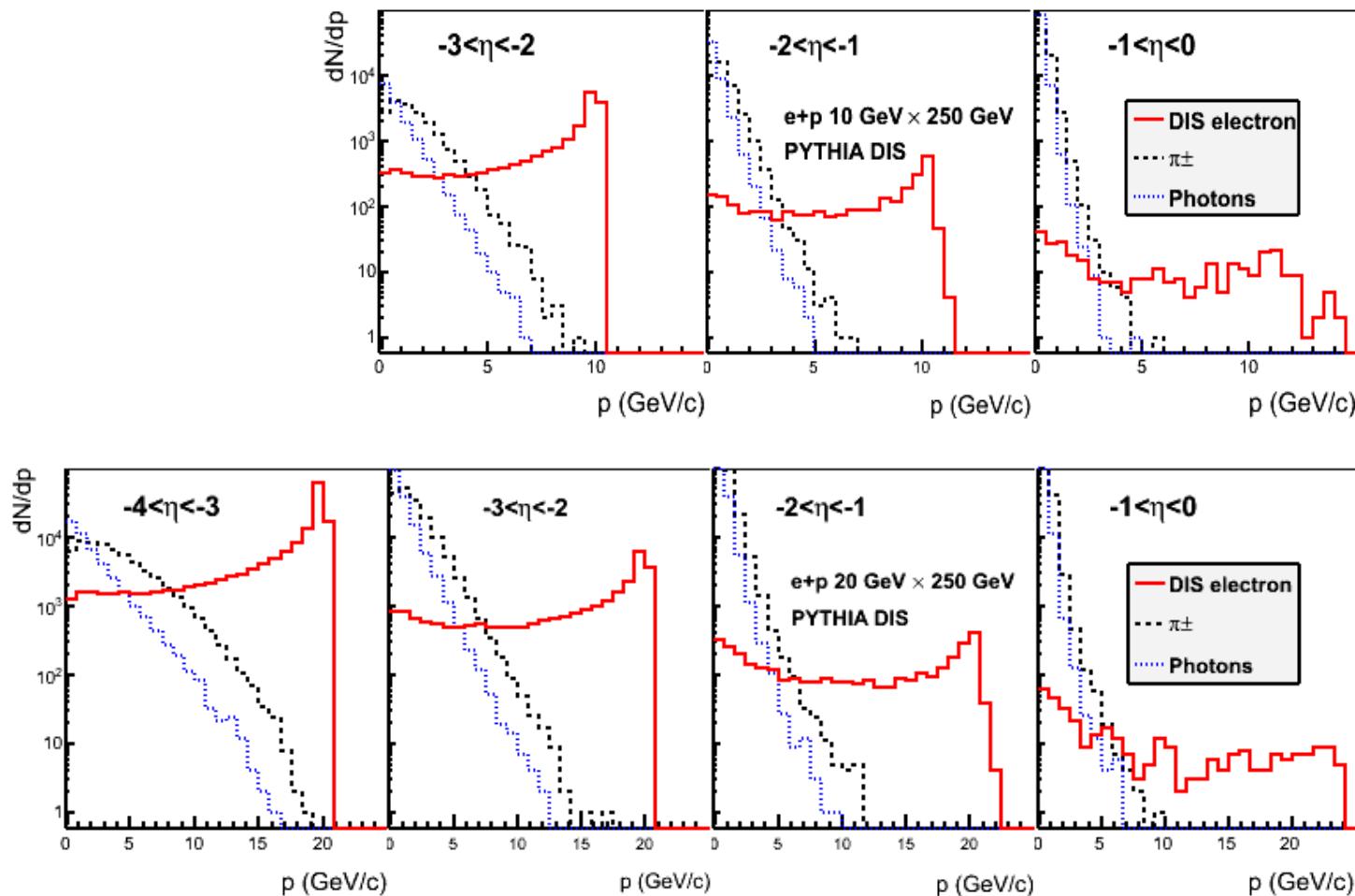
20 GeV



Need eID up to $\eta = -4$

LoI: tracking only at $\eta > -3$

eID: background



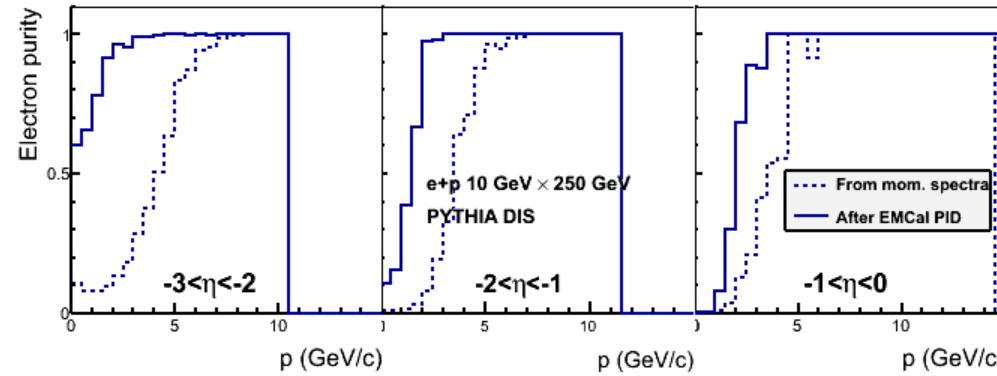
10 GeV

20 GeV

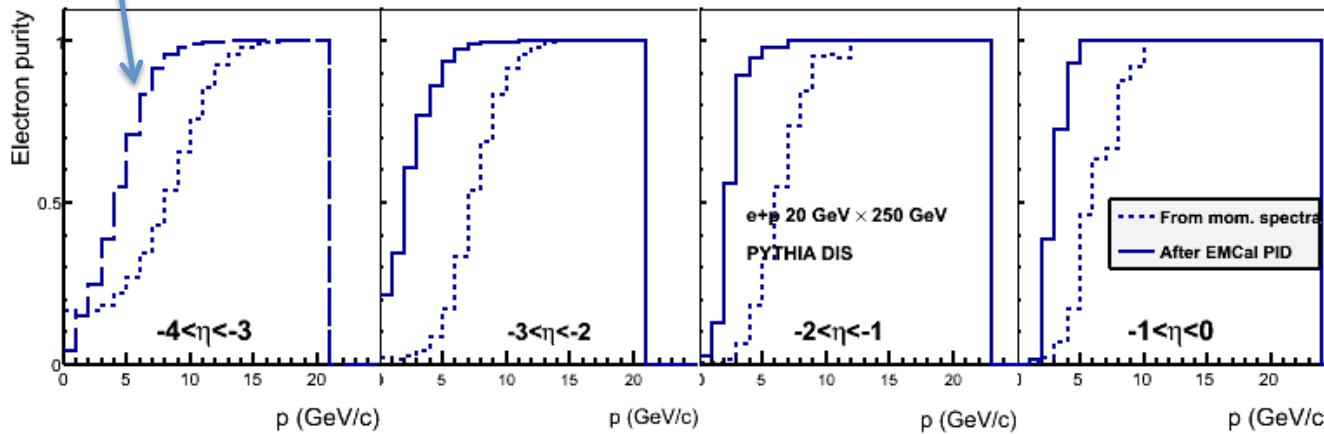
eID: purity

eID: EMCAL response and E/p
EMCal shower profile may give
another factor 3-10

No tracking
(no E/p)



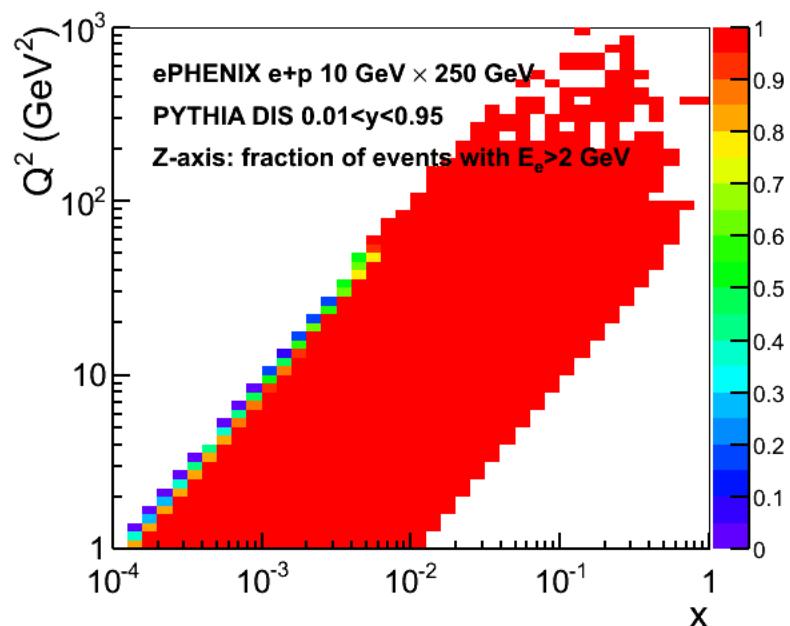
High purity
at >2 GeV/c



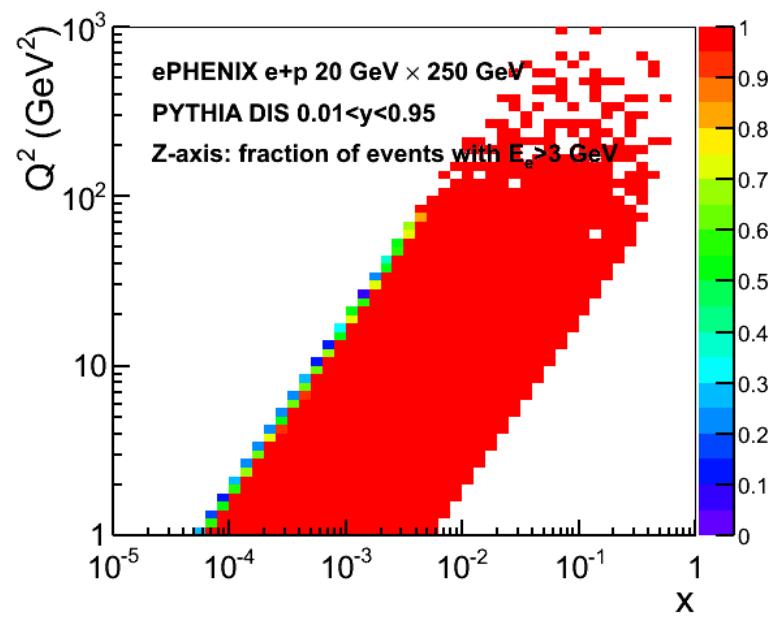
High purity
at >3 GeV/c
For $\eta > -3$

What if eID is

poor at $>2 \text{ GeV}/c$

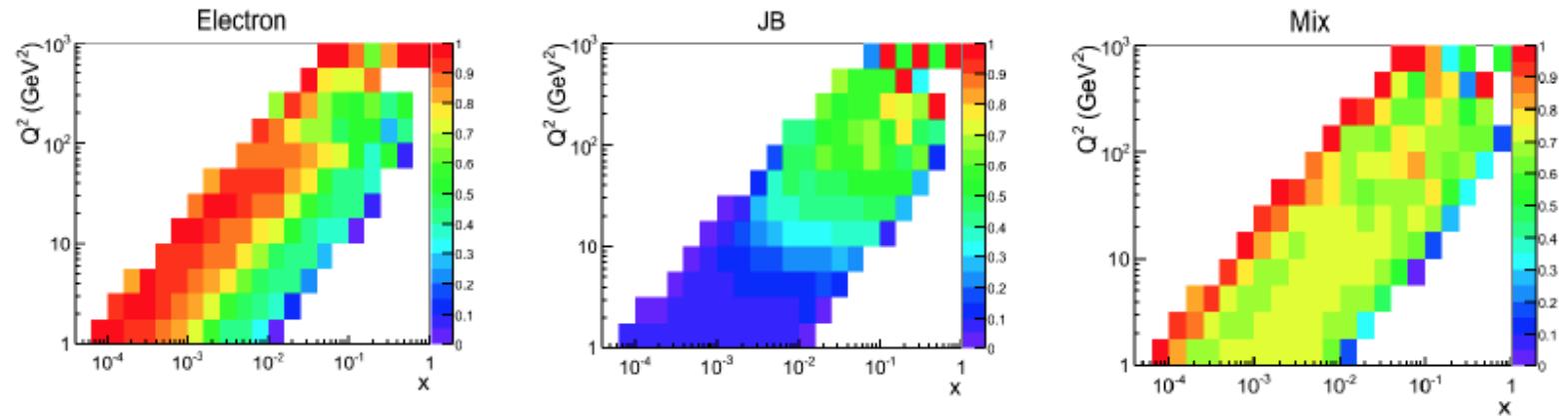


poor at $>3 \text{ GeV}/c$

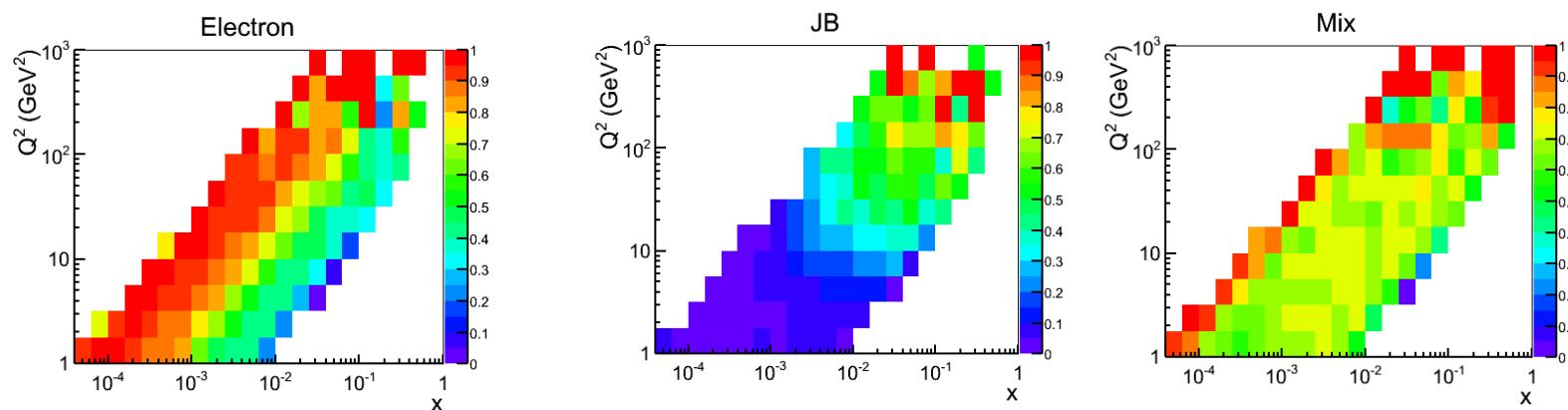


Don't lose much of
the (x, Q^2) space

Resolution effect: bin migration

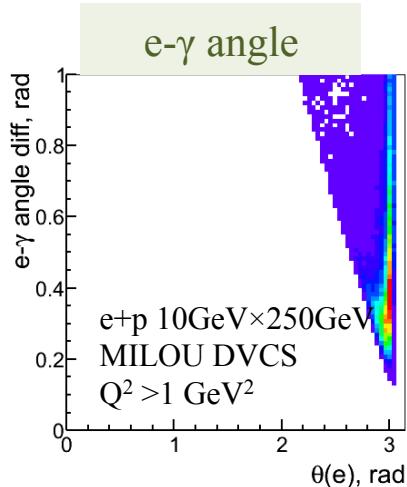


15×250 GeV



20×250 GeV

DVCS



Potential issue – separation of the scattered electron from DVCS photon (in very backward direction)

Minimal separation at 10x250GeV – 0.1 rad
Minimal separation at 20x250GeV – 0.05 rad

EMCal with granularity 0.02x0.02 should be ok

Conclusions and to-do

May need tracking down to $\eta = -4$

Momentum resolution?

Need to evaluate shower profile cut

May give additional hadron suppression factor 3-10

Need to evaluate photon rejection in eID

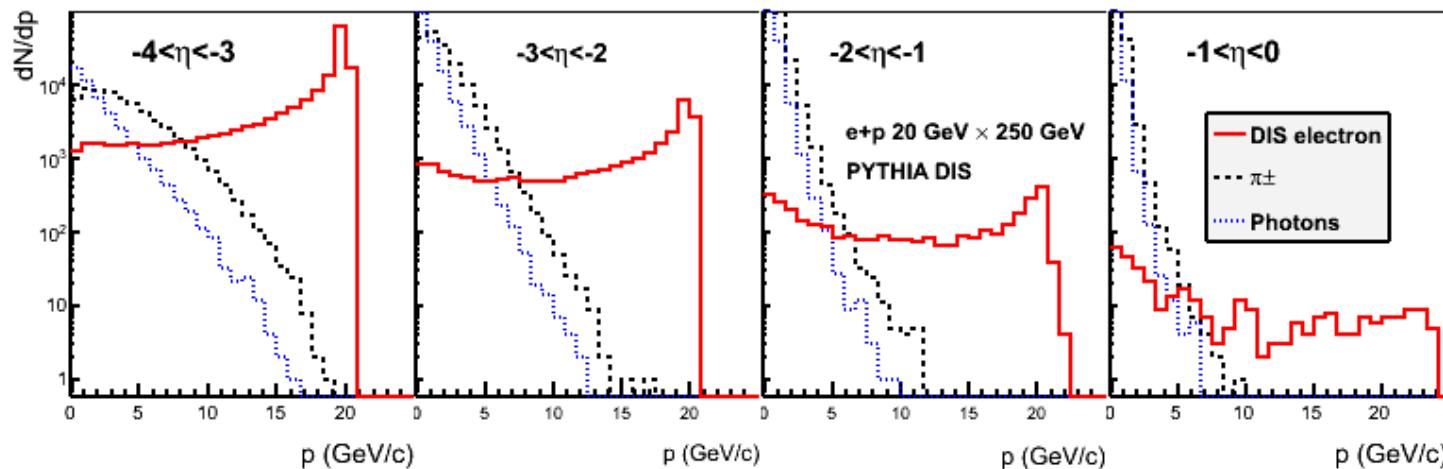
Conversion in more forward/backward direction

Backup

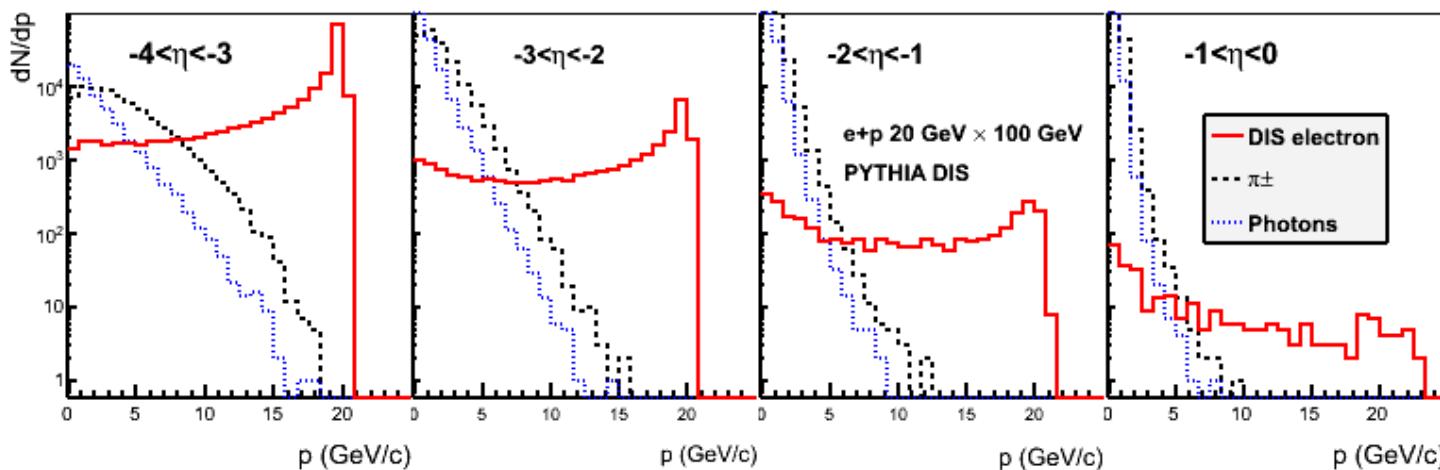
20x250 vs 20x100

More hadron background expected for lower proton beam energy

Momentum spectra



20x250

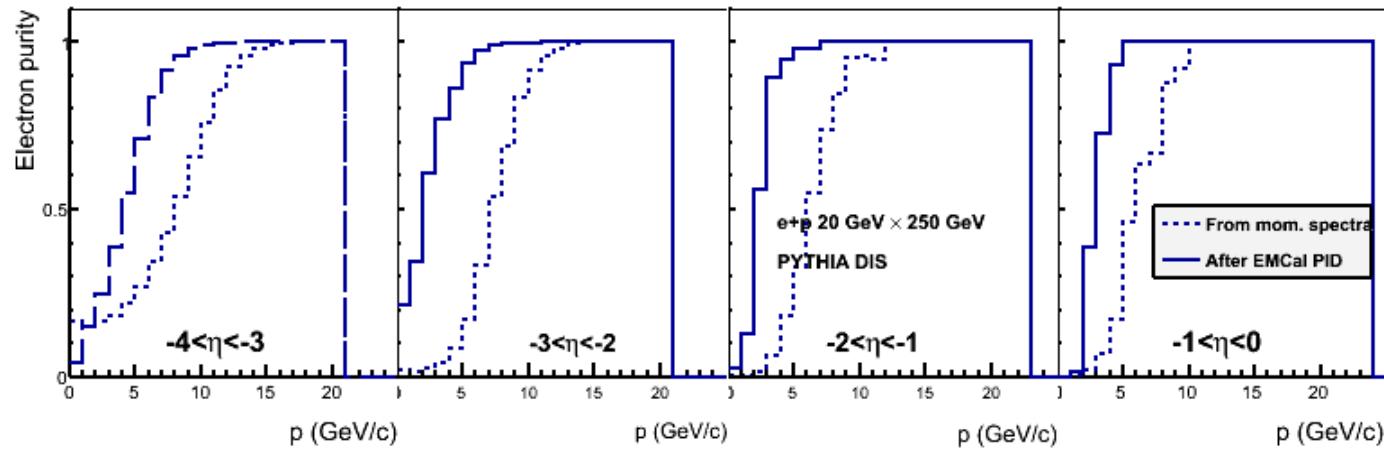


20x100

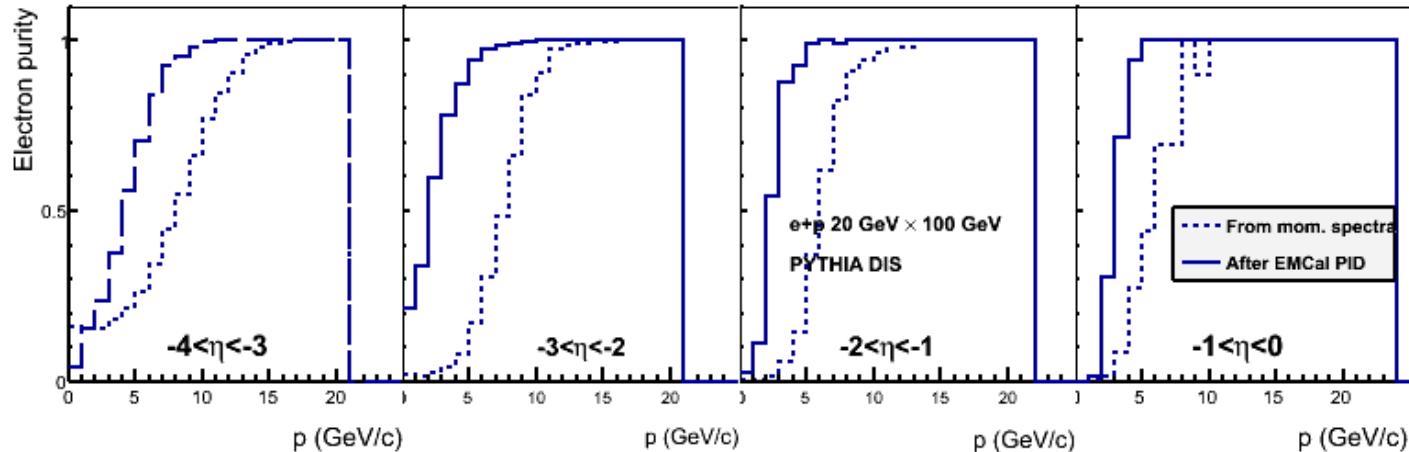
20x250 vs 20x100

More hadron background expected for lower proton beam energy

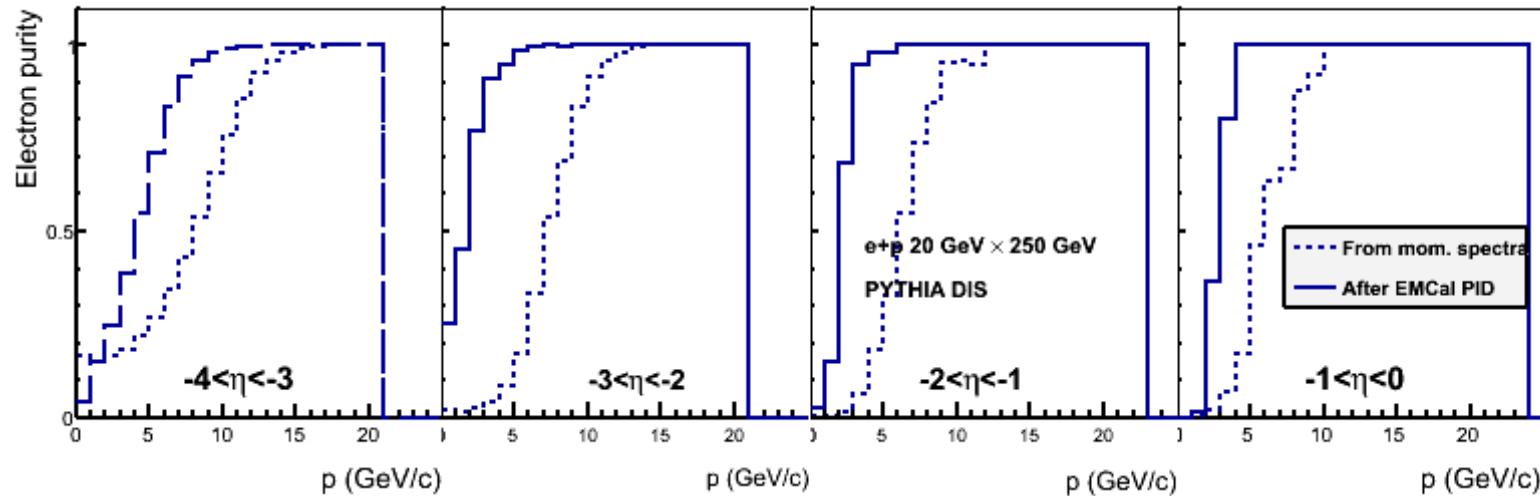
eID purity



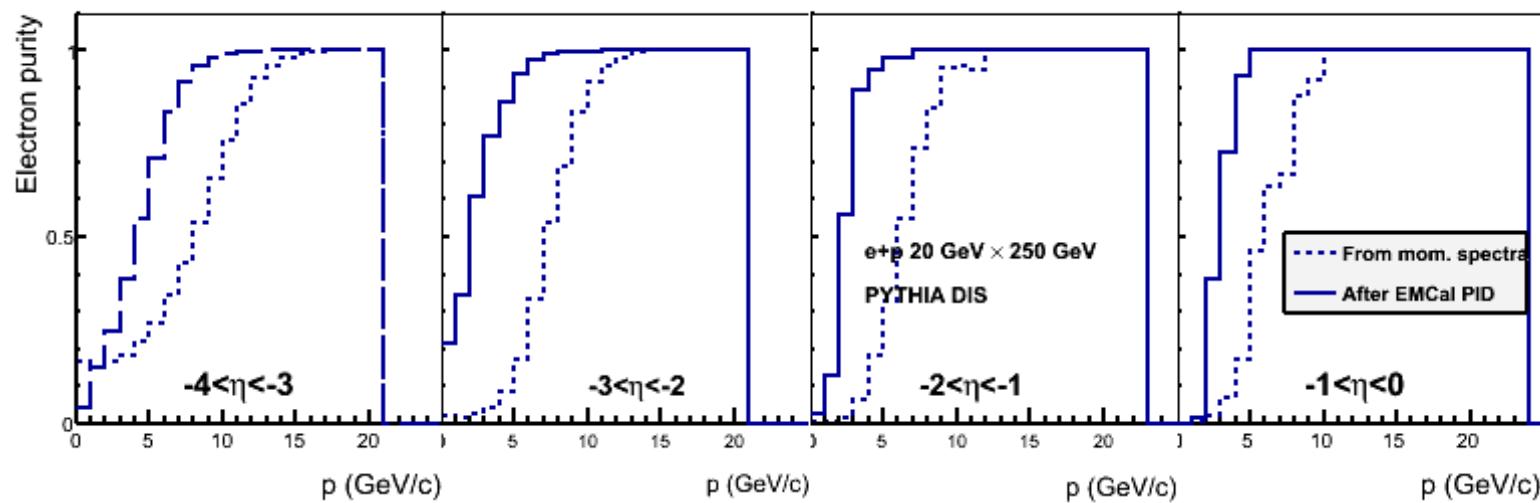
20x250



20x100



Only EMCAL
res.



EMCal
momentum
res.